P.T. Socfindo Research & Development programs

2008 – 2009 SCOPA Activity Report

Document edited for 2009 SCOPA technical Committee

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Content

SCOPA Technical Committee

June 2009

Section I - 2008 / 2009 SCOPA Presentation

Task Force and S&T Adviser general activities

1. Preamble

The object of the Socfindo – Cirad Oil Palm Agreement (SCOPA) signed early 2002 is to renew the cooperation between both signatories. According this agreement, Cirad assigns directly a senior staff to PT Socfindo as Scientific & Technical Adviser, with the approval of the PT Socfindo' Principal Director. The guidance of the Scientific & Technical Adviser activity is advised by the Technical Committee of the SCOPA.

Cirad is providing technical assistance to PT Socfindo in the following fields:

- design, organization, monitoring, analysis and interpretation of results for the genetic improvement programme and commercial seed production, based on results from local trials and from the international network coordinated by Cirad, and on research conducted on the subject by the latter,
- steering of the fertilization programmes for the commercial plantations, through an open-ended experimental network, making it possible to gradually incorporate the latest results and make more cost-effective use of the recommended inputs,
- identifying, programming and implementing any applied research judged necessary to improve crop management sequences for oil palm at PT Socfindo. Such research covers the fields of Agronomy, Genetic Improvement (including biotechnologies and variety creation), and Crop Protection,
- Staff training for both parties,
- Participation, at PT Socfindo's request, in decision-making for technical management of the estates.

2. SCOPA Task Force

2.1. Involved staff

The list includes only the staffs of PT Socfindo or Cirad mainly involved in the activities. Many other staffs have also a part of their activity linked with the SCOPA.

2.1.1. For PT Socfindo

At Head Office:

Ir. Bincar, Agricultural Department (Crop protection)
Ir. Erwanda, Agricultural Department (other activities)

At Pusat Seleksi Bangun Bandar (PSBB):

Ir. Indra Syaputra, Manager,
Ir. Taufic, Field – Assistant

Ir. Chandra Adi Pasha, Field - Assistant
Ir. Ricki, Field – Assistant (half time)
And 220 employees / contractors for seed production, seeds sale and breeding operations.

At Aek Loba Estate:

Ir. H. Edyana Suryana, Aek Loba Projects Chief – Assistant
Ir. Dadang Afandi, Field – Assistant.
And 80 employees / contractors for AL projects laboratories and field operations, including seed garden opening.

At Tanah Gambus Estate (Phytopathology Laboratory):

Ir. Zulkifli Lubis, Assistant
And 24 employees

2.1.2. For Cirad

Based at PT Socfindo

J.Ch. Jacquemard, Scientific & Technical Adviser.
F. Breton, Phytopathologist (30% of time, rest for tripartite Agreement)

Consultants based at Montpellier

T. Durand – Gasselin (Breeding, up to March 2009),
B. Cochard (Breeding)
H. Hubert de Franqueville (Phytopathology and Ganoderma disease),
L. Ollivier (Crop Protection),
J. Ollivier (Agronomy)

Support at Montpellier

L. Blangy (Seed sale, up to March 2009)
A. Flori (Statistic, Breeding data management, storage)
V. Riou (Data management)
V. Pomiès (ID Checking)
Y. Galouyé (LSU analyse)

2.2. Involved facilities

2.2.1. At PT Socfindo

- 250 ha of parental garden and germplasm at PSBB
- 510 ha of progeny and genetic trials from Aek Loba Timur Breeding Project
- 391.25 ha of collection, seed garden, parental garden and progeny trials from Aek Kwasan II Breeding Project
- 10 agronomy trials located at Aek Loba, Mata Pao, Negeri Lama, Seumanyam and Seunagan Estates,
- 329 ha of Ganoderma field tests trials located at Mata Pao, Tanah Gambus and Bangun Bandar
- 1 Phytopathology laboratory focusing on Ganoderma screening early test

2.2.2. At Cirad

- Laboratory facilities (leaf and rachis analyses)
- ID Checking laboratory
- Database management for breeding and agronomy purposes

After the scientific re-organization of Cirad, the Cirad research programs covering the PT Socfindo Research & Development Programs and the IPM / BMP targets are split between the following operations:

Involved research units

After the scientific and management re-organization of Cirad, the Cirad research programs covering the PT Socfindo Research & Development Programme, the IPM and BMP targets are split between the following departments:

At Cirad – Bios department[1]:

Oil palm breeding - UPR28 (Breeding and seed production)
Controlling pests and diseases in tree crops - UPR31 (Integrated Pest Management)
Development and Improvement of the plants - UMR96 DAP (Marker Assisted Selection, Vegetative propagation)
Biology and genetic of plant-pathogen interactions - UMR54 BGPI (IPM)

At Cirad – Persyst department:

Performance of tree crop-based systems - UPR34 (Best Management Practices)
Functioning and management of tree-based planted ecosystems - UPR80 (BMP, Breeding, Agronomy)

At Cirad – ES department:

Geographic information for agro - environmental management –UMR91 TETIS (GIS, Remote Sensing)
Water management – UMR90 G Eau (water management)
Markets, Organizations, Institutions and Actors – UMR99 MOISA (Sustainable development governance)

[1] Underlined items represent research units with strong interest for Socfindo

3. Scientific and Technical Adviser activity and general comments

3.1. Introduction

According the article 4 of the SCOPA concerning the role of the Scientific and Technical Adviser, it will be directly involved in the implementation and co-ordination of certain operations, of which both parties will update the list each year, if necessary. Both parties will define the responsibilities of the Scientific and Technical Adviser, those of SOCFINDO and those of CIRAD researchers, for each operation of the annual programme.

Scientific and Technical Adviser is coordinating all Cirad activities for Socfindo according following frame work:

- Advice Socfindo Principal Director for all scientific and technical matters linked to Research & Development programs and field practices
- Make internal audits on above matters according Principal Director' requirements
- Control and coordinate Research & Development programs implemented by Socfindo Technical Departments in following topics:
    - Improvement of the productivity and qualities of the planting material
    - Commercial seeds production program and assistance to his realization
    - Fertilisation program for the commercial estates, optimization of the field practices and fertilisation
    - Identification, programming and set up of all applied research render necessary by the improvement of the field practices in oil palm plantations. The research field covers agronomy, genetic improvement (including biotechnologies and the variety creation) and crop protection
    - Formation of trainees of the two partners
    - Support to the decision making for the technical management of the estates
- Lead Cirad support (SCOPA Agreement) to Research & Development programs cited above , ensure link between the company and concerned Cirad research units and be sure that:
    - Company requirements are well understood by Cirad experts and Heads of Research units
    - Concerned Research units have well identified possible research questions
    - These research questions are well be integrated in unit scientific project
    - Be well informed on researches status
    - Answers to Socfindo questions are delivered as soon as possible

3.2. Action plan - Road Map 2008 / 2009

3.2.1. Summary

This work schedule for 2008 / 2009 presented has been assessed by Steering Committee after its elaboration by MM Dumortier, Jacquemard and Durand – Gasselin, committed by Steering Committee for that purpose. The work schedule has been presented through road map excel file.

Monthly report has been produced according PT Socfindo Research & Development programs presentation. This action plan is split within Topics, Operations and Actions. It is available in annex 1.

Summary of action plan summarized by road map reporting is given below. Yellow color marks are indicating that corresponding box in monthly report has not been fulfilled. That is not means that nothing has been done, but nothing has been reported only.

For a total of 134 actions required, 20 are achieved or without object anymore, 71 are still in progress or are permanent, 6 are still in discussion and unfortunately 37 do not received answer that is to say 28%. Table below is detailing realization per topics.

Topics	Achieved / closed	In progress	In discussion	no information	Total
Breeding	**12**	**51**	**6**	**17**	**86**
Mainstream	0	0	0	1	1
Variety Creation	8	40	6	12	66
Seed Production	4	11	0	4	19
Agronomy	**5**	**11**	**0**	**1**	**17**
Mainstream	1	1	0	0	2
Support to fertilisation	4	10	0	1	15
Crop Protection	**3**	**9**	**0**	**19**	**31**
BSR	0	3	0	16	19
Oryctes & pests	3	4	0	0	7
Fruit Set	0	2	0	3	5
Total	***20***	***71***	***6***	***37***	***134***
%	***15%***	***53%***	***4%***	***28%***	

For coming action plan, our road map should be completed with some guidance in order to be more comprehensive for all the involved persons.

3.2.2. Actions that are still in discussion are as follow:

Updated from May 2009 Road Map report

R & D for breeding and seed production

Variety creation

Breeding

- Compile available documents and write-up other that may be missing to document all breeding guidelines: Design & setup of trials, recording, data storage and analysis, result & reporting format, seed production techniques, audit, responsibilities.

Breeding for Ganoderma (Tripartite contract extension)

- Definition of priority actions to follow-up at Socfindo, during contract extension period
- Define routine audit procedures to implement after end of contract

Fruit set and low male flowering

- Follow-up on JCJ proposition for alternate planting of material with low and higher male flower production (6-30 or 6-60 lines within blocks or alternation of entire blocks)

Aek Kwasan II programme

- Recombination program
- Revision of standard program (Bunch analyses program)

Actions that do not received answering in Road Map monthly reports

Updated from May 2009 Road Map report

R & D for breeding and seed production

Mainstream

- Establish 5 years plan for new trials to be setup

Variety creation

Breeding for Ganoderma

- Field inoculum effect
- Fallow effect
- Obtain copy of Phd thesis of Carmel Pilloti, related to pollen incompatibility studies
- Common progenies between TG lab and Dibombari lab

Breeding for Wilt tolerance

- Protocol of parallel testing for Ganoderma and Wilt tolerance

Fruit set and Low Male Flowering

- Compilation and analyze of fruit set data from ALT
- Evaluate parameter and scale in parental garden and progeny trials
- Assess effect on fruit set
- Feasibility of Breeding program for long stalk and non wrapping spathes

Aek Kwasan II

- Introduction of spathe and long stalk evaluation

Genomics for breeding (Bio 1 and Bio 2)

- Take stock of realised observations
- Set of additional observations

Seed production

Customer relationship

- Compile and maintain files with requirements
- Assess need of field visits
- Documented summary Customer complains for SCOPA meetings

Quality and quality control

- Reduce of culling ratio at prenursery & nursery stage

R & D for Agronomy and field practices

Support to fertilisation programme

Fertilisation policy

- Measure or estimate petiole cross section and leaf production number in Aek Loba trials, to allow calculation of physiological efficiency

R & D for Crop protection

Integrated management of BSR

Sanitation policy

- Priority blocks determination
- Trichoderma use
- Mounding re-evaluation
- PH adjustment effect (dolomite)

- Check if there is a relationship between soil pH and Ganoderma infection, using available data.
- Effect of erosion control by EFB and fronds
- Preventive action to protect the neighbouring palms
- Use of systematic censuses, mapping with proper scales in commercial planting
- Database management

Protection of new plantings

- Validation of Trichoderma use in new plantings (in co-operation with Lonsum)

Protection of neighbours

- Sanitation of very early spots (Padang Halaban Estate visit)

New experiments

- Effect of fallow period
- Effect of chemicals to speed-up decay
- Evaluation of BSR / USR isolates from Seumanyam Estate

Integrated management of Oryctes and other pests

Weevil activity at PT Socfindo

- Effect of spathes on weevil activity
- Effect of Low Male Flowering and long stalk on weevil population

3.2.3. Actions that are achieved or without object anymore

Updated from May 2009 Road Map report

R & D for breeding and seed production

Variety creation

Legitimacy

- Confirmation of the programme
- M. Hayun visit at Montpellier

MTA with Pobé

- Progress, priorities and calendar with Pobé management (M. Hayun mission)
- Availability of LM19029

MTA Socfindo – Socfinco

- Import and export permits
- Finalization of the documents
- Finalization of A and B groups crossing maps

Aek Kwasan II

- Revision of statistical planting design

Seed production

Mainstream

- Bunch quality in some PT Socfindo estates

Socfindo requirements

- Recommend mixing ratio for high rainfall environments reducing assisted pollination needs

Socfinco requirements

- Import permits, crossing maps follow-up
- Prepare BB206D * LM2T materials for 2009 (Safacam 2009)

R & D for Agronomy and field practices

Support to fertilisation programme

Consultancy

- Dr Foster joint mission with J. Ollivier & F. Dumortier

Nutrition

- Assessment of nutritional problems on Divisions 4 & 5 at Seunagan
- Circulate fixed fertilisation program for first 5 years after planting

Soil analyses

- Assessment of soil analyses as efficient tool for nutrition management and fertilization policy

R & D for Crop protection

Integrated management of Oryctes and other pests

Sufetula problem at Seunagan

- Literature review
- Observation of control plots with trenches and chemical control
- Assessment of real impact on specific plot

3.3. 2008 / 2009 STA Activities

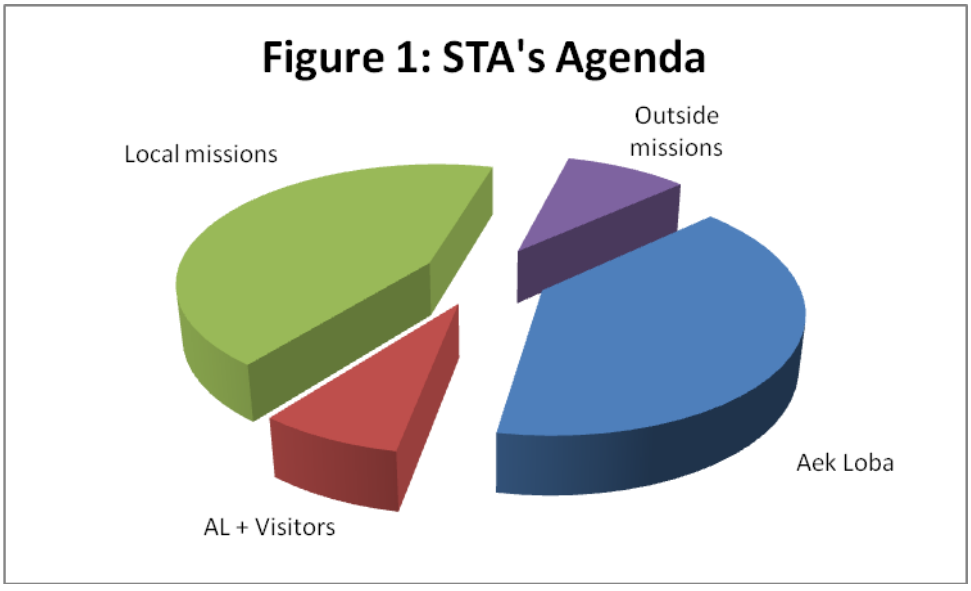
3.3.1 Agenda

TABLE 1 summarises the STA's agenda since July 2008.

TABLE 1: 2008 – 2009 STA's Agenda (in days)

Month	STA's agenda (days)				Cirad Consultants / visits received (days)	Socfinco Visitors Received (days)
	Aek Loba	AL + Visitors	Missions			
			Local	Outside		
July-08				5		
August-08	13		7		10	
September-08	12		13			2
October-08	13	3	6		3	11
November-08	12		16		24	1
December-08			5	6	3	
January-09	12			3		
February-09	1	7	19		29	10
March-09	10	5	12		15	
April-09	13		13		3	
May-09	11	4	7	4	6	
June-09	2		11	5	12	11
Total	99	19	109	23	105	35
%	39.6	7.6	43.6	9.2		

For the period July 2008 – June 2009, STA's Agenda *(Figure 1)* is shared between 2 slightly unequal parts: 47% of the time at Aek Loba and 53% of the time outside Aek Loba, but 60% of STA's time is



dedicated to visitors (Cirad and non – Cirad), local missions and participation to conferences. At Aek Loba, 8 % of the time is devoted to visitors. The cumulative number of days for Cirad Consultants missions reaches 105 and 35 for Socfinco partners.

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3.3.2. Consultants missions

As summarized in Agenda above, Socfindo received Cirad consultants for a total of 105 mission days since July 2008. For many of them, consultant missions were coupled.

Dispatched by R&D programs, the following table takes stock of theses missions.

R & D Programme	Consultant / Visitor	Number of missions	Coupled mission	Total number of expert days
Agronomy	J Ollivier	2	1 coupled with F Dumortier (4 days)	27
Breeding and Seed Production	T Durand Gasselin, B Cochard	3	2 coupled with F Dumortier (18 days)	47
Crop Protection	L Ollivier	1		10
Ganoderma Scopa	H de Franqueville	1	1 coupled with F Dumortier (3 days)	11
Certipalm / OPGP	N Billotte	1		10
			Total	105

Socfindo received 2 missions for 27 expert days for agronomy, 3 missions for 47 expert days for breeding, 1 mission for 10 days for crop protection (entomology) and 1 mission, accumulating 11 expert days for Phytopathology. One mission has been received for Certipalm / OPGP purpose.

3.3.3. Conferences, publications, E-presentations, and general reports

Conferences, visits

Scopa meeting (July 2008, Medan – Indonesia)
RSPO GHG WG meeting (May 2009, Kuala Lumpur – Malaysia)
Indonesia Palm Oil Conference and Price Outlook 2009 (Bali, December 2008)

Publications

BASKETT, JPC; JACQUEMARD, JC; DURAND-GASSELIN, T; EDYANA SURYANA, HAYUN ZAELANIE and EKO DERMAWAN (2007). “Planting material as key input for sustainable palm oil” Journal of Oil Palm Research (Special Issue – October 2008) p. 102 - 114

Books

Guide book for sustainable oil palm (in progress, 8 chapters already written)

E-presentations (slide-show)

PT Socfindo Research & Development programme (May 2008)

Documents and general reports

See Foot Notes on Road Map activity report section

3.3.4. Road map reporting

Action plan road map reporting has been required on monthly base. An Excel version of this road map has been prepared detailing all topics, operations and actions to achieve. At end of every month, road map report form is sent to Consultants. A report, including all contributions is edited 2 weeks after. Scientific & technical Adviser is the resource person for road map monthly report. The first report was produced in August 2008. At end of May 2009, there were 9 calls for reporting sent to 7 persons.

Return ratio is reaching respectively 18% (excluding STA) for UR28 (breeding and Phytopathology), 78% for UR31 (crop protection) and 67% for UR34 (Agronomy)

3.4. Work schedule for 2009 / 2010

Work Schedule for 2009 / 2010 should derive from 2008 / 2009 action plan. New version of this action plan and its road map should be prepared during SCOPA Technical Committee and assessed by Steering Committee.

Section II - 2008 – 2009 STA Scientific & Technical report

This section is reporting more specifically Scientific and Technical Adviser personal input in 2008 / 2009 action plan. Its presentation is following road map feature.

General topics

Meeting Road Map at Brussels

A road map revision meeting held at Brussels in January 2009. This meeting was chaired by R Helsmoortel with the participation of F Dumortier, T Durand – Gasselin, C Houssiau, J Ch Jacquemard and J Ollivier. Results were agreed also by A Tordeur, present in Belgium at that time. Results of this revision have been included in road map for January reporting.

F Dumortier mission (10 - 19 / 02 /09)

Focusing on breeding topics mainly, F Dumortier shared his time between Aek Loba and PSBB programs. His mission was jointed partially with B Cochard and T Durand – Gasselin held during the same month. His mission report has been received on 23rd march 2009. [2]

1. Research & Development programme for Breeding and Seed Production

Mainstream

Cirad Breeding consultant visits have been received in November 2008 (T Durand – Gasselin) and in February 2009 (B Cochard and T Durand – Gasselin). The first mission covered all the fields usually scrutinized. November 2008 visit report has been received in February 2009 in soft and hard copies[3]. The second visit focuses on recombination program for the future and preparation of taking over between T Durand – Gasselin and B Cochard. February report visit is not yet received (20th May 2009).

Summary of last available results for Aek Loba Timur Breeding Block has been prepared for Socfin group annual report. It includes information concerning each trials and summary of General Combining Abilities[4].

Establishment of 5 years plan for new trials is not yet formalized and needs more investigation and discussions. In first estimation, it should includes the last part of AKII, improvement of specific dura

[2] Socfindo vist Report 2009.02 – F. Dumortier.pdf
[3] TDG SOCFINDO 2231 -08 ANGLAIS.pdf
[4] ALT Project v2009_02.doc

families (BB2141D, BB206D, BB391D and PO2995D) and improvement of specific B group families like LM5T * LM311P.

1.1. Variety creation

Different concepts for progeny trials implementation have been assessed for the close future. They include reduction of number of trees planted by progeny that allows, for the same surface implemented, increasing by 1 to 2, the number of partners for each tested parent. Variant of NC2 crossing map design is also introduced with additional test – crosses. Pollen collection and crossing map functioning are also specified[5].

1.1.1. Breeding

Databases

- Wilt & Ganoderma

Corrected ALT 2007 data for Ganoderma[6] are available as General Combining Ability data calculated from 2008 census[7]. Ganoderma Database under Access is in implementation at Montpellier. Synthesis after TG trial 172 has been done. Hard and soft document is expected soon.
Concerning wilt test at Dibombari, DBTF 8 and 9 are completed.

- Agronomic data

Excel tool to calculate adjusted data through common crosses has been proposed. It proposes also expression of data on LM2T * DA10D base[8]. Aek Loba Timur database under EXCEL format is available for the following data: production, bunch quality, height at 6 years old and 9 years old, canopy projection and leaf area up to December 2008[9]. Adjusted ALT database under EXCEL format is available for height at 6 years old[10], nutritional status at young and mature stage (not yet published).
Incomplete data are available for Low male Flowering risk. Data for 2007 have been sent to Montpellier but not yet analyzed.

- Censuses on other parameters

Terminal Fruit Abnormality is affecting some of parent progenies and some categories. Investigations have been done at Aek Loba and Lae Butar (commercial planting)[8] and PSBB (Seed garden and Collection). TFA seems not have important agronomic consequence, but it is present in both A and B group. So, specific census should be done to avoid any unintentional selection. Organisation of permanent census has been proposed for PSBB and Aek Loba Seed garden, parental garden and Collection to keep information[11].

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[5] Structure crossing map and design09_02.xls
[6] Gano9597_2007 v 080406b.xls; AGC gano FD.xls
[7] AGC gano FD2008.xls; Sortie_agcgano_origine v3.xls
[8] Aek Loba Timur Block Correcting factors.doc; correction tool_h6.xls
[9] AlbaseLSU 080628.xls; AlbaseOER v080628.xls; Albaseprod v080628.xls; ALT vegetative v080628.xls
[8] Fruiting Abnormality at Lae Butar v080915.pdf
[11] Terminal Fruit Abnormality census.pdf

- Write-up structure and content of existing databases

This important work is on progress. Socfindo progeny trial file is updated to 2008 end[12]. Socfindo progeny file that is including all planted progenies at Aek Loba Timur, Aek Kwasan II and PSBB updated to 2008 end is available and should be dispatched soon for verification and comments[13]. Socfindo pedigree file updated at 2008 end is under construction. Additional information has been proposed by F Dumortier last May.

- Integration of existing databases for breeding purpose (i.e. GCA, Ganoderma & Wilt)

Structure of Socfindo databases have been assessed with F Dumortier (see foot note 1). Complete set of files should be available at 2009 end including trials, progenies, pedigree, tree files and results for 2009 end with 2008 campaign data.

- Compile available documents and write-up other that may be missing to document all breeding guidelines: Design & setup of trials, recording, data storage and analysis, result & reporting format, seed production techniques, audit, responsibilities.

See above. This point should be scrutinized and progress evaluated.

1.1.2. Breeding for Ganoderma

Gano Seed production

- Biennial revision

A new version has been prepared last December 2008 by Breeding Consultant[14]. It is proposing planting materials based on specific families and progenies from A and B group. Their Ganoderma value is issuing from GCA evaluation at Aek Loba Timur (see Foot Note n° 4), summary of Tanah Gambus testing[15] and Ganoderma census done in PSBB seed garden[16]. It is based on 22 progenies from 9 families from A group and 18 progenies from 10 families from B group (7 families from La ME origin and 3 from Yangambi origin). An adaptation taking in account availability of pollen and categories produced for 2009 as been set up last February with PSBB[17].

Commercial planting; Gano 1 to Gano 3 series

- Censuses and biennial evaluation

2008 Ganoderma census has been sent to Montpellier. General Combining Ability evaluation has been done by V Riou. File is available under Access[18]. Comments should be done soon by Phytopathology and Breeding consultants.

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[12] Socfindo trials v0903.xls
[13] Socfindo progenies udt08 prov.xls
[14] Table 11, Special Ganoderma mating design (November 2008 Breeding mission report, p. 40)
[15] Annex 1 ganoderma early test.pdf (November 2008 Breeding mission report)
[16] Annex 2 Gano seed garden Group A.pdf; Annex 2 Gano seed garden Group B.pdf (November 2008 Breeding mission report)
[17] Crossing map for Socfindo Ganoderma tolerant planting material rev 090312.doc
[18] Ganoderma_alt08.mdb

Census file for all the PSBB and Gano 1 to Gano 3 by end of 2008 is ready. It should be communicated in June to Phytopathology and Breeding consultants.

Wilt and Gano crossed breeding

- Search of Gano tolerance in highly Wilt tolerant resources

Pollen availability for TG Ganoderma tests concerning crossing maps BB2002 U5 (A Group) and BB2002 U6 (B Group) has been proposed[19]. The document is proposing list of pisiferas to test and, in addition, pisiferas that could be confirmed as Ganoderma tolerant.

- Development of Wilt / Gano tolerant materials

1.1.3. Breeding for Wilt tolerance

Material for Dibombari test

- Definition and priorities for crosses and progenies included in the programme

Pollen availability for Dibombari Wilt tests concerning crossing maps BB2006H has been proposed[20]. The document is proposing list of pisiferas to test and, in addition, pisiferas that could be confirmed as wilt tolerant.

1.1.4. Fruit set and Low Male Flowering

Low Male Flowering

- Assessment of parameters, criteria and measurement scale for Male Flowering

A first study done with data updated at 2006 end has been edited[21]. This study demonstrates clearly that the recording of the male inflorescences production is crucial variable evaluating the performance of the genotypes in the progeny trials in addition to the other variables as CPO / ha, OER, height increment, canopy extension and Ganoderma susceptibility. CPO and OER are depending closely from the good pollination of the female inflorescences.

The study shows that, in many cases, excellent performance of genotypes is fully dependant to their environment for pollen supply, not only at young age but also at full adult stage. Such genotypes are excellent only because there are “bad” progenies in their vicinity. The phenomenon is amplified for the clones. Revision of Seed production programme and evaluation criteria of the parent quality should take in account this new criterion.

Assessment of observation procedure has been done. New set of data updated by 2007 end and 2008 end is available and should be evaluated soon.

[19] Pollen G+F testing 090420.xls
[20] Pollen G+F testing 090420.xls
[21] Male flowering in Aek Loba Timur Trials.pdf

- Commercial packaging composition to avoid assisted pollination needs

Suggestions based on study mentioned above are proposing sets of categories for very favourable areas, high water stress areas and intermediate area[22].

Fruit set

- Female flower receptivity studies - compile results from fruit set observations in seed bunches

Data have been collected from 772 seed production bunches at PSBB. Unfortunately, only numbers of normal and Parthenocarpic fruits per spikelets have been recorded. Dry fruit number remains unknown. Thus, it is not possible to analyse properly fruit set in number genetic effect. New set of observation has been ordered in April. Number of dry, Parthenocarpic and Normal fruits from each spikelet should be recorded from 10 bunches coming from 10 different dura parents for each dura family used in seed production.

1.1.5. Legitimacy

PT Socfindo programme

- Confirmation of the programme

Current ID Checking program has been assessed. It could be summarized as follow:

Step	Scope
I	Legitimacy of Socfindo pisifera and their parents
II	1976 plantings and LM2T legitimacy
III	Deli families for seed production
IV	Questionable progenies in Aek Loba Timur project
V	ALT and AKII parents

Step is equivalent to priority. Steps I, II, IV and V are nearly achieved. Sampling of some parents has been delayed because they have been recently pruned (pisifera and tenera). Some required parents cannot be sampled because they are dead. Deli families for seed production sampling should be achieved by next July[23]. Full report on techniques and identity assessment has been produced by breeding consultant and dispatched[24].

Illegitimacy management

- Identification and elimination of illegitimate parental progenies

Report on LM2T self and LM2T x LM9T legitimacy is included in report cited in Foot Note n°22. Updated Catdesc and Genit files under Access format have been received[25]. They include all modifications required. A note confirming these modifications has been sent[26].

[22] Set of categories for various area.pdf
[23] ID Checking status 0903jcj.doc
[24] Finger-printing note bilan sept 2008-final.pdf in french
[25] Catalogues_2009_02.mdb
[26] List of illegitimate genitors and their new progeny number.doc

ID Checking laboratory

- M. Hayun visit at Montpellier

Visit of ID Checking operation and laboratory by M. Hayun has been done in October 2008.

1.1.6. MTA with Pobé

M. Hayun October mission

- Progress, priorities and calendar with Pobé management

New calendar and program of exchange have been assessed between M Hayun, Pobé and Cirad during the mission. Administrative course is completed for this year. Seeds and pollen shipment were received in last February. Seeds are still in germination process (batch 04/2009). For unknown reason, PSBB does not restart MTA crossing maps. Only 2007 seeds are available at PSBB. The new calendar assessed by M Hayun should be reviewed. Corresponding crossing maps has been restarted in May. Pollens are available, so the seeds should be available before 2009 end for shipment to Pobé.

Exchange of germplasm

- Follow-up of progress of LM2T germplasm introduction

There are evidence of difficulties to reach objectives for T*D, T*T and T*P crosses. It has been suggested in last February wind-up meeting to look at embryo rescue techniques. Contacts have been done with TAMORA STEKINDO. Two limited batches of tenera seeds (2 * 50) have been given to this laboratory. Support for procedures and media required is expected by TAMORA STEKINDO. Meeting to investigate collaboration, methods and objectives has been organized in June.

1.1.7. MTA with Socapalm (Socfinco – Socfindo)

Administrative course

- Finalization of the documents

Administrative course for this MTA operation has been completed. Two shipments are scheduled to Cameroun: one in July, a second in November. If necessary, a third one could be organized early 2010.

Technical course

- Finalization of A and B groups crossing maps

For A group, 3 family bulks should be prepared based on BB2141D, BB206D and DA115D origins that is to say 125 crosses representing 37500 dry seeds. For B group, 4 family bulks are scheduled based on BB111T, BB111T * LM2T, PO4922T and PO4157T origins, that is to say 102 crosses and 39200 dry seeds.

- Follow-up on production of crosses at Socfindo and establish dispatch schedule to Socfinco

First shipment, scheduled for next July, should include 44 progenies / sibs / selfings from A group (12795 seeds) and 35 progenies / sibs / selfings from B group (9057 seeds). Monthly reports are produced and dispatched[27] . At eve of May, it remains 37 pollinations for A group and 13 B group pollinations to do for mainstream[28]. Some pollination should be scheduled to compensate too small available number of seeds.

- Localize and introduce additional parental / seed garden at Aek Loba Seed Garden

It is assessed that all the recombinations produced for this MTA should be planted at Aek Kwasan II seed garden. That is representing potentially 53 progenies or 23ha for A group and 34 progenies or 16 ha for B group[29]. Final planting program should be confirmed before end of 2009.

1.1.8. Aek Kwasan II Progeny trials

Mainstream program

Reviewed 2009 and 2010 planting program has been assessed in November 2008 with breeding consultant (See Foot Note n° 2). Current status in Aek Loba nursery[30] should allow planting of 5 new progeny trials (79.1 ha excluding borders), A Group Parental Garden (8 ha), B Group Parental Garden (12.7 ha), A Group Seed Garden (29 ha), B group Seed Garden (4.2 ha) and few palms for collection for around 133 ha excluding borders. Proposal has been done for 2010 planting and material is in processing. 2010 program should include 5 progeny trials (around 50 ha excluding borders), A Group Parental Garden (7.6 ha), B Group Parental Garden (18.9 ha), A Group Seed Garden (8.7 ha), B Group Seed Garden (7.3 ha), recombination with Cowan and Yaligimba introductions (6.5 ha), Cameroun prospection (14 ha) and MTA back-up (39 ha to confirm) for around 152 ha.

Recombination program is still under construction and evaluation. Aek Kwasan II protocols are completed up to AL GP 38[31].

Complementary programs

- Breeding populations of interest include: BB206D - BB391D - BB2141D - PO2995D

Proposals for observation and additional bunch analyses have been done for BB206D[32], BB391D[33] and LM5T * LM311P[34]. Specific program for additional bunch analyses is running for BB2141D at PSBB and should start in 2nd semester at Aek Loba.

[27] MTASocfindo_socfinco_Group A...xls and MTAsocfndo_socfinco_Group B...xls series
[28] Material MTA Socfindo 090404.doc
[29] Proses_MTA_April2008 revised jcj090418_rev.xls
[30] 2009_project DA090314.xls
[31] ALGP 38 protocolb V090320.doc
[32] BB206D improvement.doc
[33] BB391D improvement.doc
[34] Improvement of LM5T_LM311P.doc

Revision of statistical planting design

Fisher bloc design with 48 trees for D*P crosses and 64 palms for T*D crosses has been adopted for 2008 planting and after. Some genetic bridges should be planted at 96 trees in order to improve connection with network trials.

1.2. Seed production

Provisional Seed Production Unit is running at Aek Loba since April 2008.

1.2.1. Socfindo requirements

Specific Crossing Map

- Use of best Ganoderma tolerant materials; biennial revision

See Gano seed production in 1.1.2. Breeding for Ganoderma section

- Recommend mixing ratio for high rainfall environments reducing assisted pollination needs

Set of categories mentioned in 1.1.4. Fruit Set and Low Male Flowering section has been used in connection with Ganoderma tolerance collected information to propose specific planting material dispatching for Socfindo 2010 planting program[35]. Three groups of estates have been proposed:

1- West Aceh and Negeri Lama: avoid very High Low Male Flowering risk, low BSR pressure
2- Aek Loba and Padang Pulo: some blocs could require planting materials for high BSR pressure
3- Group II and Sungei Liput: avoid Deli * Yangambi materials and require planting material for high BSR pressure.

1.2.2. Socfinco requirements

Shipments

- Best Wild tolerant materials, taking account Ganoderma information. Avoid PO6104 derived materials

In last December, proposals for 2010 and 2011 plantation programs (2009 and 2010 shipments) were completed. For 2011 plantation program, some disturbances in imported pollen supply have required to prepare an alternative with Socfindo pollen. This revision has been proposed in February 2009[36]. Deadlines for pollinations are as follow:

May 2010 shipment (Okumu, SPFS, SAFACAM, SOCAPALM):	30th May 2009
July 2010 shipment (Eseka):	15th August 2009
November 2010 shipment (Congo):	1st January 2010

[35] Choice of categories for Socfindo 2010 rejuvenation program.doc
[36] Note concerning Socfinco 2011 order.doc

May 2010 shipment is prepared with 55 remaining imported pollen unit and Socfindo pollen source. It is possible to prepare July shipment with imported pollen.

- Seeds dispatches and shipments follow-up

All shipments have been sent and received for 2008. Some germination problems in Cameroon and Congo were pointed.

Imported pollens

- Import permits, crossing maps follow-up

Socfindo has ordered required pollen to Cirad in December 2008. For several reasons including administrative complications to make exchange of pollen on commercial base, execution of this order has been delayed. Finally, order has been reduced to 450 units that should be provided by CNRA LA ME. Unfortunately, LA ME seems not able to proposed required pollen quality for complete order. By June 2009, 70 units only could be received.

ID Checking

- Take samples from additional nursery programs at Socfindo

This action is in bracket. Parents are proven through general ID Checking program.

Materials for Safacam

- Prepare BB206D * LM2T materials for 2009

That has been taken in account for 2009 Safacam shipment

1.2.3. General seed production program

Taking in account huge depression of seed market and last results from our breeding program, we are able to propose very compact seed production program that is combining very high quality and potential of planting material proposed to our customer and preference to this quality instead to larger seeds production.

Genetic improvement is representing around 280 USD / ha / year in additional gross revenue compared to current planting material. A main program designed for 16 million germinated seeds and an additional program designed for 3.8 million germinated seeds per year are proposed. In 2011, the main program should run on 34.7 million dry seeds base with additional 1000 genitors opened at Aek Loba seed garden in January 2011 (24 million germinated seeds). 19% of seeds could be considered as Ganoderma less susceptible.

They will involve 4170 genitors from PSBB (58%) and Aek Loba (42%) seed gardens. This new program should start in next may at PSBB and next June at Aek Loba. Expected gross revenue generated by the program should reach 13 to 15 million USD. Lower grade seeds could be produced also, if management requires it. Their crop potential is reduced by around 0.5 t CPO / ha / year (-6.1 %)

compared to main program proposed. Such material could be produced at PSBB only. Annual capacity of lower grade material reaches 13.4 million germinated seeds per year[37].

Tentative of crop potential in term of its major characteristics as Oil Extraction Rate (OER), Fresh Fruit Bunches (FFB) per tree and per hectare and Crude Palm Oil (CPO) per hectare for planting materials produced actually by PSBB and in narrow future by Aek Loba has been proposed for discussion[38].

Aek Kwasan II Seed Garden

Bagging procedures and harvesting quality control have been reviewed to take in account the very young age of the genitors. Specific censuses were done before genitor opening and elimination done accordingly. Pollinations were postponed in January 2009 to take in account seed market evolution.

Sanitation (PSBB)

- Sanitation of palms in parental gardens (excavation of rotten tissues + mounding with Trichoderma). Test Phyto products mentioned by TDG.

Specific sanitation policy for parental garden has been proposed and is running. For such high value palms, early detection of BSR and sanitation procedures including excavation of rotten tissues, mounding, injection and / or application of fungicides are combined[39]. Note that several chemicals are tested by Socfindo Agriculture Department. Sanitation procedure should be adapted according experiments results.

Packaging composition

- Prepare mixing ratio suitable for:
    1. Environment with low water deficit
    2. Environment with high water deficit

Packaging composition proposal is already cited in Low Male Flowering action point (1.1.4. Fruit Set and Low Male Flowering operation).

Procedures

- Continuous improvement

Minor improvements have been proposed, particularly concerning label securing and hermaphroditism problem. Breeding program processes are following full ISO procedures since April 2009. New operational procedures are under construction for temperature controls in hot rooms and blank pollination. Audit of germination procedures at PSBB done pointed mainly deviation or insufficiency in standard procedures in hot treatment duration, temperature control in hot rooms and germinated seeds sorting procedure. Proposals to correct the situation have been done and were implemented[40].

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[37] PT Socfindo Seed production program 2009 – 2010.doc
[38] Socfindo seed production potential 090414.doc
[39] Oryctes and Ganoderma sanitation in seed garden.doc
[40] Report on PSBB germination procedure audit.doc

New operation procedures have been prepared for implementation for several fields: use of Toples boxes, use of tray and hot rooms temperature controls.

1.3. Vegetative Propagation

Tamora Stekindo laboratory has been visited by F Dumortier and H Williams in November 2008.

1.3.1. Clone creation

Pure male palm has been identified in commercial planting at Aek Loba. Observation of male flowering is running. Pollen has been collected. Leaf sample to check its identity has been sent to Montpellier. There is some uncertainty about its origin because it is originating from very female category [S6305 = (DA5D * DA3D) * LM2T].

2. Research & development program for Agronomy and field practices

Mainstream

Planting material quality at Lae Butar extension has been evaluated to support Socfindo decision in term of replanting program[41].
Nutrition * Planting material interaction and breeding for low fertilizer input paper has been proposed to PIPOC 2009. It is based on recent analyse of ALCP61 / 62 results and nutritional status at Aek Loba Timur Bloc at young and mature stage[42].

2.1. Support to fertilization program

2.1.1. Consultancy

Cirad Agronomy missions

A final version of 2009 fertilizer table has been proposed in November 2008 and adjusted in March 2009[43]. This new fertilizer table is taking in account several factors spit within general and specific factors:

General factors:
Age: Fixed fertilizer table from N0 to N5,
Generation of planting material: specific rate for generation I plantings (< 1989 planting year).
Outstanding crop: FFB / tree exceeding 229 kg

Impact of water deficit, agro-climatic conditions or EFB applications is follow through general nutritional status.

Specific factors:
Nitrogen: Fluctuation of Nitrogen contents and N / Total Cation balance
Phosphorus: Equilibrium N / P
Potassium: Fluctuation of Potassium contents
Magnesium: Fluctuation of Mg / Total Cation balance
Boron: systematic application from N0 to N5 only

Fertilisation rates are base on nutritional status calculated on 3 years running base.

[41] Lae Butar new blocs.doc
[42] Genetic signature in mineral nutrition in oil palm.doc
[43] Socfindo Standard Fertilisation Programme version 2009 V09_3.doc

2.1.2. Nutrition

Young age

- Circulate fixed fertilisation program for first 5 years after planting

It is a part of 2009 Socfindo Fertilizer Table. To date, fertilisation program for N0 to N5 is as follow:

Age	NPK (15-15-6-4)	Urea	RP	TSP	KCl	Kieserite	Dolomite	Borax	Total
N0	300	200	500					10	1042
N1	2500	700						150	3620
N2		2800		950	1800	700		175	7091
N3		3000	2000		2250	700		200	8309
N4		2750	2000		2500		750	100	8100
N5		2750	1250		2750		1250	100	8100

This document has been sent to Brussels.

2.1.5 Ongoing experiments

Field practices

- Spathes removing versus Assisted Pollination

An experiment (ALES 19) has been implemented in November 2008 on commercial block planted with Deli * LA ME material. Three treatments are studied:

- Manual assisted pollination
- Manual removing of spathes
- Control

Observations include male flowering, bunch analyses and FFB recording.

3. Research & Development Program for Crop Protection

3.1. Integrated Management of the BSR

3.1.1. Sanitation policy

Field practices

- Bowl removal and destruction procedure

Investigation and dissections studying possible correlation between external and internal symptoms of BSR on adult palms has been made at Tanah Gambus[44]. This study confirms poor correlation between early symptoms and bowl destruction degree. Several observations done with Phytopathology consultant confirm possible involvement of typical scare form, so-called “Star” in BSR evolution. A specific experiment to track appearance of this “Star” is running at Aek Loba (ALES 22) both in nursery and field. First results should be published before 2009 end.

[44] BSR dissection at Tanah Gambus full.pdf

4. New investments

4.1. Seed Production unit at Aek Loba

Due to market crunch, this investment has been delayed to 2010

4.2. Germinator at PSBB

Due to market crunch, this investment has been delayed to 2010

4.3. Tissue Culture laboratory at Aek Loba

Priority of this investment remains under evaluation

4.4. ID Checking / bio-molecular certification laboratory at Aek Loba

Assess feasibility to setup fingerprinting laboratory at Socfindo (around 300,000 euro)
Priority of this investment remains under evaluation

4.5. Leaf / rachis / soil / fertilizer analyse laboratory at BB

Priority of this investment remains under evaluation

4.6. Socfindo research Department

Priority of this investment remains under evaluation

5. Round Table for Sustainable Palm Oil

JC Jacquemard has been nominated as representative of Oil Palm planters on Green House Gas Working Group mandated by RSPO Board to propose amendments to criteria and guidance taking in account reduction of green house gas in oil palm plantations (routine management and creation).

First meeting occurred in May 2009. After revision of drafted documents, public consultation should be proposed in next July, second working group meeting should be organized early September to assess final proposal for RSPO board meeting and General Assembly in November 2009.

Annex 1
SCOPA ROAD MAP – 2008 / 2009 EDITION
Action plan summary

SCOPA ROAD MAP
2008 – 2009 EDITION – Action plan

General topics

1. Research & Development programme for Breeding and Seed Production

Mainstream

Establish 5 years plan for new trials to be setup

1.4. Variety creation

1.1.1. Breeding

Databases

- Wilt & Ganoderma
- Agronomic data
- Censuses on other parameters
- Write-up structure and content of existing databases
- Integration of existing databases for breeding purpose (ie: GCA, Ganoderma & Wilt)
- Compile available documents and write-up other that may be missing to document all breeding guidelines: Design & setup of trials, recording, data storage and analysis, result & reporting format, seed production techniques, audit, responsibilities.

1.1.2. Breeding for Ganoderma

TG Phyto Lab program

- 2009 planting material test
- Priorities for nursery testing
- 2009 / 2010 program
- Compilation of results demonstrating good repeatability in test and good relationship with field observations
- Linked set of progenies to allow GCA calculation from Ganoderma tests (starting March 2009)
- Testing against tolerance with different isolates - results compilation from earlier work showing absence of interaction
- Increasing of test capacity (100 / month)

Tripartite Contract extension

- Definition of priority actions to follow-up at Socfindo, during contract extension period
- Define routine audit procedures to implement after end of contract

Breeding program for Ganoderma tolerance

- Establish crossing design to multiply sources of tolerance

Gano Seed production

- Biennial revision

Commercial planting; Gano 1 to Gano 3 series

- Censuses and biennial evaluation

Gano 4

Ganoderma trials

- Field inoculum effect
- Fallow effect
- Obtain copy of Phd thesis of Carmel Pilloti, related to pollen incompatibility studies

Trichoderma

- Trichoderma multiplication
- Test of isolates
- Test of application procedures

Wilt and Gano crossed breeding

- Common progenies between TG lab and Dibombari lab
- Crossed links between both programs
- Search of Gano tolerance in highly Wilt tolerant resources
- Development of Wilt / Gano tolerant materials

1.1.3. Breeding for Wilt tolerance

Material for Dibombari test

- Definition and priorities for crosses and progenies included in the programme
- Protocol of parallel testing for Ganoderma and Wilt tolerance

1.1.4. Fruit set and Low Male Flowering

Low Male Flowering

- Assessment of parameters, criteria and measurement scale for Male Flowering
- Follow-up on JCJ proposition for alternate planting of material with low and higher male flower production (6-30 or 6-60 lines within blocks or alternation of entire blocks)
- Commercial packaging composition to avoid assisted pollination needs

Ablation policy

- Study Ablation and low male flowering in Socfindo condition

Fruit set

- Female flower receptivity studies - compile results from fruit set observations in seed bunches
- Compilation and analyze of fruit set data from ALT

Wrapping spathes and stalk length

- Evaluate parameter and scale in parental garden and progeny trials
- Assess effect on fruit set
- Feasibility of Breeding program for long stalk and non wrapping spathes

1.1.5. Legitimacy

PT Socfindo programme

- Confirmation of the programme

Socfinco / Socfindo commercial materials

- Sampling program from nursery

Illegitimacy management

- Identification and elimination of illegitimate parental progenies

ID Checking laboratory

- M. Hayun visit at Montpellier
- Technology transfer

1.1.6. MTA with Pobé

M. Hayun October mission

- Progress, priorities and calendar with Pobé management

Exchange of germplasm

- Follow-up of progress of LM2T germplasm introduction
- Finalize dispatch of material ready from Pobé and from Socfindo
- Availability of LM19029

1.1.7. MTA with Socapalm (Socfinco – Socfindo)

Administrative course

- Import and export permits
- Finalization of the documents

Technical course

- Bunch analyzes for Tenera choice
- Finalization of A and B groups crossing maps
- Localize and introduce additional parental / seed garden at Aek Loba Seed Garden
- Follow-up on production of crosses at Socfindo and establish dispatch schedule to Socfinco

1.1.8. Aek Kwasan II Progeny trials

Mainstream program

Complementary programs

- Multiplication and inter-crossing of Ganoderma / wilt tolerant resources
- Breeding populations of interest include: BB206D - BB391D - BB2141D - PO2995D
- Introduction of spathe and long stalk evaluation

Intensification of bunch analyze program

- Revision of standard program
- Introduction of fruit set observation in analyze procedure
- Revision of crossing maps procedures

Revision of statistical planting design

1.5. Seed production

1.2.1. Socfindo requirements

Specific Crossing Map

- Use of best Ganoderma tolerant materials; biennial revision
- Recommend mixing ratio for high rainfall environments reducing assisted pollination needs

1.2.2. Socfinco requirements

Shipments

- Best Wild tolerant materials, taking account Ganoderma information. Avoid PO6104 derived materials
- Seeds dispatches and shipments follow-up

Imported pollens

- Import permits, crossing maps follow-up

ID Checking

- Take samples from additional nursery programs at Socfindo

Materials for Safacam

- Prepare BB206D * LM2T materials for 2009

1.2.3. General seed production program

Aek Kwasan II Seed Garden

- Revision taking in account Ganoderma and Low male Flowering issues

Sanitation (PSBB)

- Sanitation of palms in parental gardens (excavation of rotten tissues + mounding with Trichoderma). Test Phyto products mentioned by TDG.

Packaging composition

- Prepare mixing ratio suitable for:
    1. Environment with low water deficit
    2. Environment with high water deficit

Customer relationship

- Compile and maintain files with requirements
- Assess need of field visits
- Documented summary Customer complains for SCOPA meetings

Quality & Quality Control

- Reduce of culling ratio at prenursery & nursery stage

Procedures

- Continuous improvement

1.6. Vegetative Propagation

1.6.1. Clone creation

Vegetative Propagation Laboratory

- Preparation of final document

1.3.2. Clone evaluation

Clone trials implementation

- Evaluation and feasibility

2. Research & development program for Agronomy and field practices

Mainstream

2.1. Support to fertilization program

2.1.1. Consultancy

Dr Foster's Visit

- Joint mission with J. Ollivier & F. Dumortier

Cirad Agronomy missions

2.1.2. Nutrition

Peat soils

- Assessment of nutritional problems on Divisions 4 & 5 at Seunagan

Young age

- Circulate fixed fertilisation program for first 5 years after planting

Rachis diagnosis / foliar analysis

- Use as complement to standard leaf sampling

- Determining fertiliser tables

Nutmon software

- Evaluation at Aek Loba Estate where soil analyses data are available

2.1.3. Soil analyzes

PT Socfindo program

- Assessment of soil analyses as efficient tool for nutrition management and fertilization policy

2.1.4. New experiments

Fertilisation policy

- Fertilizer reduction strategy by using EFB
- Utilization of compounds
- Define protocols and establish N2-P2 and N2-K2 trials in collaboration with Lonsum
- Study effect of calcic amendment (gypsum) at Negeri Lama where Ca levels and pH are low
- Compare effect of Korn Kali, KCl and NaCl applications on high Ca content soils

2.1.5 Ongoing experiments

Field practices

- Spathes removing vs Ass Pol

Fertilisation policy

- Measure or estimate petiole cross section and leaf production number in Aek Loba trials, to allow calculation of physiological efficiency
- Determining critical levels

3. Research & Development Program for Crop Protection

3.1. Integrated Management of the BSR

3.1.1. Sanitation policy

Management

- Priority blocks determination
- Guide line for uprooting

Field practices

- Bowl removal and destruction procedure
- Trichoderma use
- Mounding re-evaluation
- pH adjustment effect (dolomite)
- Check if there is a relationship between soil pH and Ganoderma infection, using available data.
- Erosion control (EFB and fronds)
- Preventive action to protect the neighbouring palms
- Guidelines for sanitation before replanting

Spread monitoring

- Use of systematic censuses, mapping with proper scales in commercial planting
- Database management

3.1.2. Protection of new plantings

Field practices

- Validation of Trichoderma use in new plantings (in co-operation with Lonsum)

3.1.3. Protection of neighbors

Field practices

- Sanitation of very early spots (Padang Halaban Estate visit)

3.1.4. New experiments

Field practices

- Effect of fallow period
- Effect of chemicals to speed-up decay

Biodiversity

- Evaluation of BSR / USR isolates from Seumanyam Estate

3.2. Integrated Management of *Oryctes* and other pests

3.2.1. *Sufetula* problem at Seunagan

- Literature review
- Observation of control plots with trenches and chemical control
- Assessment of real impact on specific plot

3.2.2. *Oryctes* Integrated control

Biocontrol

- Efficiency of Baculovirus originating from PNG and / or Fiji Islands

Insect behaviour

- Insect dispersion and pheromone action
- Insect activity (feeding versus mating)
- Mapping of Oryctes damages in specific plots

3.3. Integrated Management of the fruit set

3.3.1. Cirad support of new introduction

Introduction of selected new species

3.3.2. Monitoring of weevil populations in Cameroon

Species comparison

- Compare 4 species activity and attraction to flowers in West Africa
- Tools for E. kamerunicus activity evaluation

3.3.3. Weevil activity at PT Socfindo

Weevil activity

- Effect of spathes on weevil activity
- Effect of Low Male Flowering and long stalk on weevil population

4. New investments

4.1. Seed Production unit at Aek Loba

4.2. Germinator at PSBB

4.3. Tissue Culture laboratory at Aek Loba

4.4. ID Checking / bio-molecular certification laboratory at Aek Loba

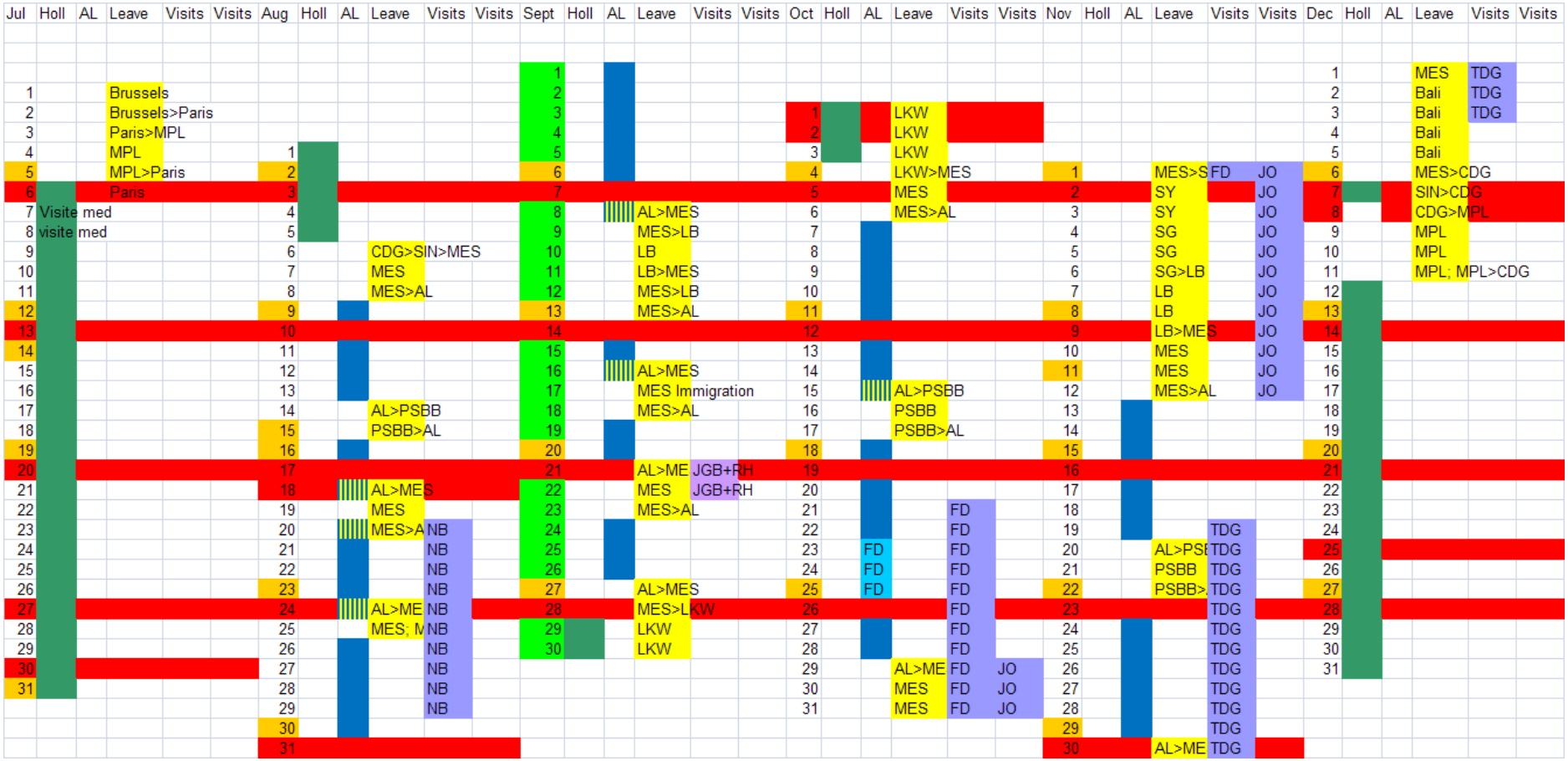
Assess feasibility to setup fingerprinting laboratory at Socfindo (around 300,000 euro)

4.5. Leaf / rachis / soil / fertilizer analyse laboratory at BB

4.6. Socfindo research Department

Annex 2
Scientific & Technical Adviser Agenda

Scientific & technical Adviser Agenda for 2008 second semester



Jul	Holl	AL	Leave	Visits	Visits	Aug	Holl	AL	Leave	Visits	Visits	Sept	Holl	AL	Leave	Visits	Visits	Oct	Holl	AL	Leave	Visits	Visits	Nov	Holl	AL	Leave	Visits	Visits	Dec	Holl	AL	Leave	Visits	Visits
												1																		1			MES	TDG	
1			Brussels									2						1			LKW									2			Bali	TDG	
2			Brussels>Paris									3						2			LKW									3			Bali	TDG	
3			Paris>MPL									4																		4			Bali		
4			MPL			1						5						3			LKW									5			Bali		
5			MPL>Paris			2						6						4			LKW>MES			1			MES>S	FD	JO	6			MES>CDG		
6			Paris			3						7						5			MES			2			SY		JO	7			SIN>CDG		
7	Visite	med				4						8			AL>MES			6			MES>AL			3			SY		JO	8			CDG>MPL		
8	visite	med				5						9			MES>LB			7						4			SG		JO	9			MPL		
9						6			CDG>SIN>MES			10			LB			8						5			SG		JO	10			MPL		
10						7			MES			11			LB>MES			9						6			SG>LB		JO	11			MPL; MPL>CDG		
11						8			MES>AL			12			MES>LB			10						7			LB		JO	12					
12						9						13			MES>AL			11						8			LB		JO	13					
13						10						14						12						9			LB>MES		JO	14					
14						11						15						13						10			MES		JO	15					
15						12						16			AL>MES			14						11			MES		JO	16					
16						13						17			MES Immigration			15			AL>PSBB			12			MES>AL		JO	17					
17						14			AL>PSBB			18			MES>AL			16			PSBB			13						18					
18						15			PSBB>AL			19						17			PSBB>AL			14						19					
19						16						20						18						15						20					
20						17						21			AL>ME	JGB+RH		19						16						21					
21						18			AL>MES			22			MES	JGB+RH		20						17						22					
22						19			MES			23			MES>AL			21				FD		18						23					
23						20			MES>A	NB		24						22				FD		19				TDG		24					
24						21				NB		25						23				FD		20			AL>PSI	TDG		25					
25						22				NB		26						24				FD		21			PSBB	TDG		26					
26						23				NB		27			AL>MES			25				FD		22			PSBB>	TDG		27					
27						24			AL>ME	NB		28			MES>LKW			26				FD		23				TDG		28					
28						25			MES; M	NB		29			LKW			27				FD		24				TDG		29					
29						26				NB		30			LKW			28				FD		25				TDG		30					
30						27				NB								29			AL>ME	FD	JO	26				TDG		31					
31						28				NB								30			MES	FD	JO	27				TDG							
						29				NB								31			MES	FD	JO	28				TDG							
						30																		29				TDG							
						31																		30			AL>ME	TDG							

Scientific & Technical Adviser Agenda for 2009 first semester

Day	Jan	Holl	AL	Leave	Visits	Visits	Fev	Holl	AL	Leave	Visits	Visits	Visits	Visits	Mar	Holl	AL	Leave	Visits	Apr	Holl	AL	Leave	Visit	Mai	Holl	AL	Leave	Visits	June	Holl	AL	Leave	Visit	Visit
Su							1			AL>MES					1		LO		LO																
Mo							2			MES					2		LO		LO											1			PSBB	BC	
Tu							3			MES; M	Hdf				3		LO		LO											2			PSBB	BC	FD
We							4			TG	Hdf				4		LO	AL>ME	LO	1			TG>ME	JO						3			PSBB	BC	FD
Th	1						5		Hdf	TG>AL	Hdf				5			MES	LO	2			MES	JO						4			PSBB	BC	FD
Fr	2						6		Hdf		Hdf				6			MES; M	LO	3			MES	JO	1					5			PSBB	BC	FD
Sa	3						7		Hdf		Hdf				7			SIN		4			MES>AL		2					6			PSBB	BC	FD
Su	4						8		Hdf		Hdf				8			SIN>MES		5					3					7			MES	BC	FD
Mo	5						9			AL>TG	Hdf				9			MES>AL		6					4					8			Met Hov	BC	FD
Tu	6						10			TG>BB	Hdf	FD			10					7					5					9			MES	BC	FD
We	7			Bxl			11			BB>MP	Hdf	FD			11					8					6					10			Met Gar	BC	FD
Th	8			Bxl			12			MES	Hdf	FD	TDG	BC	12					9					7					11			Windup	BC	FD
Fr	9			Bxl			13			MES; M	Hdf	FD	TDG	BC	13					10					8					12				BC	FD
Sa	10						14		FD			FD	TDG	BC	14					11					9					13					
Su	11						15		FD			FD	TDG	BC	15					12					10					14					
Mo	12						16		FD			FD	TDG	BC	16					13					11					15			MES>CDG		
Tu	13						17		FD	AL>MES		FD	TDG	BC	17					14			AL>PSBB		12			AL>MES		16			CDG>BES		
We	14						18			MES		FD	TDG	BC	18					15			PSBB		13			MES>KL		17					
Th	15			CDG>SIN			19			MES		FD			19					16			PSBB>MES		14			KL(GHG)		18					
Fr	16			SIN>MES			20			MES>AL					20					17			MES; MES>A		15			KL(GHG)		19					
Sa	17			MES			21								21			AL>MES		18					16			KL>MES		20					
Su	18			MES>AL			22								22			MES		19					17			MES		21			MPL (SCOPA)		
Mo	19						23			AL>PSBB					23			MES	JO	20					18			MES>AL		22			MPL (SCOPA)		
Tu	20						24			PSBB					24			MES>M	JO	21					19					23			MPL (SCOPA)		
We	21						25			PSBB	LO				25			BB	JO	22					20					24			MPL (SCOPA)		
Th	22						26			PSBB;	LO				26			BB;BB>	JO	23					21					25			MPL (SCOPA)		
Fr	23						27		LO	TG; TG>	LO				27		JO		JO	24			AL>MES		22					26					
Sa	24						28		LO		LO				28			PP	JO	25			MES		23					27					
Su	25														29		JO		JO	26			MES		24					28					
Mo	26														30		JO	AL>BL;	JO	27			MES>PSBB		25			AL>MES		29					
Tu	27														31			TG	JO	28			PSBB>AL		26			MES	BC	30					
We	28																			29					27			PSBB	BC						
Th	29																			30					28		BC	MES>A	BC						
Fr	30																								29		BC		BC					
Sa	31																								30		BC		BC					
Su																									31		BC		BC					